

FROL'KIS, Vladimir Veniaminovich, doktor med. nauk; KUL'CHITSKIY, Konstantin Ivanovich, dots.; MIL'KO, Vasilii Ivanovich, dots.; KUZ'MINSKAYA, Undina Anatol'yevna, kand. med. nauk; FEDOROV, I.I., red.; RAYZ, A.L., tekhn. red.; CHUCHUPAK, V.D., tekhn. red.

[Coronary blood circulation and experimental myocardial infarct] Koronarnoe krovoobrashchenie i eksperimental'nyi infarkt miokarda. Kiev, Gosmedizdat USSR, 1962. 254 p.  
(MIRA 16:11)

(HEART---INFARCTION) (CORONARY VESSELS)

KUZ'MINSKAYA, U.A. [Kuz'myns'ka, U.A.]

Respiration, glycolysis, glycogen content and phosphorylase activity in the myocardium in coronary insufficiency. Ukr. biokhim. zhur. 34 no. 6: 883-887 '62. (MIRA 16:4)

1. Biochemistry Department of Kiev Medical Institute.  
(CORONARY HEART DISEASE)

KUZ'MINSKAYA, U.S.

Carbohydrate and phosphorus metabolism within the heart in  
pituitrin coronary insufficiency. Trudy Inst. klin. i  
eksper. kard. AN Gruz. SSR 8:407-410 '63. (MIRA 17:7)

1. Meditsinskiy institut, Kiev.

KUZ'MINSKAYA, Ye.I.

Accelerated fluorescence analysis of water for *Escherichia coli*.  
Vod. i san. tekhn. no.1:39 Ja '61. (MIRA 14:9)  
(WATER--MICROBIOLOGY) (FLUORESCENCE MICROSCOPY)

KUZMINSKI, B.

"Karol Bohdanowicz as an Outstanding Geologist and Polish Traveler." p. 50  
(PROBLEMY, Vol. 10, no.2, Jan., 1954, Warszawa, Poland)

SO: Monthly Lists of East European Accessions, LC, Vol. 3, no.5, May 1954/Uncl.

POLAND/General Division, History, Classics, Personnel A-2

Abs Jour: Ref Zhur-Biologiya, No 5, 1958, 18857

Author : Kuzminski Boleslaw

Inst : -

Title : Benedykt Dybowski-The Researcher of Baikal

Orig Pub: Problemy, 1957, 13, No 3, 211-214

Abstract: A Zoologist, See Ref Zhur Biologiya, 1955, 20537

Card 1/1

KUZMINSKI, Boleslaw

Polonica in the onomasticon of natural science: Latin  
botanical names with a Polish root. Problemy 20 no. 4: 241-  
242 '64.

KUTMINSKI, Polcelew

Polonica in natural science nomenclature; Latin biological  
names based on Polish radicals. Problemy 20 no.7:434-437  
1964.



COUNTRY : POLAND  
 CATEGORY : Chemical Technology. Chemical Products and  
 Their Applications. Lacquers. Paints. Coatings  
 ABS. JOUR. : AZKhim., No. 19, 1959, No. 69841  
 AUTHOR : Kuzminski, M.; Szyndkiewicz, A.  
 TITLE : Experimental Application in the Industry of  
 Protective Coatings, Made of Synthetic Sub-  
 stances, Applied as Pseudo-Liquidified Films \*  
 ORIG. PUB. : Przem. fermentacyjny, 1958, 2, No 3, 93-98  
 ABSTRACT : Investigations were conducted in the employ-  
 ment of polyamides, polyethylene, polymethyl-  
 methacrylate and polyvinylchloride as protec-  
 tive coatings (C). C were applied in the form  
 of pseudo-liquidified films and by combustion  
 spraying. C offer high anti-corrosion protec-  
 tion at the corresponding minimum thicknesses--  
 0.5mm for polyamides, 0.8-2.0mm for polyethy-  
 lene and polyvinylchloride. -- Z. Fabinskiy.

\*and by Spraying.

CARD:

1/1

~~KUZMINSKI, H.~~

COUNTRY : Poland H-4  
 CATEGORY :  
 ABST. JOUR. : REKhim., No. 10 1959, No. 57440  
 AUTHOR : Blonska, A. and Kuzminski, A.  
 INST. : Not given  
 TITLE : The protection of steel structures from corrosion in industrial areas by the use of sprayed aluminum coatings  
 ORIG. PUB. : Przeglad Chemiczny, 10, No 1, 15-19 (1959)  
 ABSTRACT : sprayed aluminum coatings (AC) on steel structures afford the base metal good protection against corrosion as a result of the fact that aluminum is anodic relative to steel. The aluminum oxides present at the surface of the Al do not dissolve readily in water and in acids. The coatings consist of aggregations of atomized metal particles held together by adhesive and cohesive forces. Notwithstanding their considerable porosity, the AC are resistant inasmuch

CARD: 1/2

COUNTRY : Poland H-4  
 CATEGORY :  
 ABST. JOUR. : REKhim., No. 10 1959, No. 57440

"APPROVED FOR RELEASE: 06/19/2000" CIA-RDP86-00513R000928110005-5

AUTHOR :  
 INST. :  
 TITLE :  
 ORIG. PUB. :  
 ABSTRACT : as the pores are blocked by corrosion products. Proper preparation of the steel surface is essential in assuring good bonding of the AC to the base metal. The products of the corrosion of the AC adhere tightly to the coating and do not dissolve in acid media. Methods used in applying the AC are described, and equipment is recommended for the process.

V. Kashcheyev

CARD: 2/2

KUZMINSKI, M.

Distr: 4E2c(j)/4E2c

15

✓ The resistance of plastic sprayed coatings in various corrosive media. Mieczysław Kuzminski and Anna Szymkiewicz (Inst. Precision Mechanics, Warsaw). Prace Inst. Mech. 7, No. 26, 82-8 (1959).—Corrosion resistance of polyamide, polyethylene, poly(methyl acrylate), and poly(vinyl chloride) flame-sprayed coatings on steel in water and water soln. of some acids, salts, and alkalis was tested. Hardness, abrasion, and thermal resistance, steel adherence, porosity, and swelling in water also were investigated.

I. Dobrycka

5-929 (N/B)  
1-MJC (ja)  
2

cas

KUZMINSKA, Alina; KUZMINSKI, Roman

Use of spasmodex in labor. Pol. tyg. lek. 20 no.14:519-521  
5 Ap '65.

1. Z I Kliniki Poloznictwa i Chorob Kobięcych AM w Gdansk  
(Kierownik: prof. dr. med. Stefan Metler).

KUZ'MINSKIY, A.B., kandidat tekhnicheskikh nauk.

Mechanics of turning cylindrical peat blocks by means of a rotating cylinder. Trudy Inst.torf. AN BSSR 4:60-67 '55. (MLRA 9:3)  
(Peat machinery)

**KUZ'MINSKIY, A.B., kandidat tekhnicheskikh nauk.**

**Study of forces acting on the peat mass between a pair of rollers  
and some considerations on the working surface of roller-type  
forming machines. Trudy Inst.torf.AN BSSR 4:150-156 '55.**

**(MLBA 9:3)**

**(Peat machinery)**

А.А. МИНСКИЙ, А-13

✓ 476. MECHANICS OF THE TURNING OF CYLINDRICAL FEAT BY A ROTATING  
ROLLER. Минский, А.А. (Trud. Inst. Teor. Akad. Nauk Belorussk. SSR  
(Trans. Inst. Theor. Math. Russ. S.S.R.), 1955, vol. 4, 60-67; title in Ger.  
Proc. (Feat Ind., Moscow), 1956, (1), 39).

PICHUGIN, A.A., dotsent, kand.tekhn.nauk; BOCHAROV, Ye.V., inzh.. Prini-  
 mali uchastiye: KUZ'MINSKIY, A.G., inzh.; VORONKINA, M.A., inzh.;  
 FEDOROV, A.A., inzh.; BELOUSOV, M.A., inzh.ekonomist; PROSVIRNIN,  
 G.V., inzh.; KNIGINA, G.I., dotsent, kand.tekhn.nauk; LESNIKOV,  
 V.V., dotsent, kand.tekhn.nauk; SIDOROV, A.K., dotsent, kand.  
 arkhitektury; KARTASHOV, A.A., arkhitektor; BARITSKIY, P.F., dotsent,  
 kand.tekhn.nauk; KULISHOV, D.A., prof.; ZDESENKO, G.M., kand.tekhn.  
 nauk; ALEKSANDRENKO, A.I., dotsent, kand.tekhn.nauk; STREL'NIKOV,  
 G.Ye., kand.tekhn.nauk; VANDYEV, V.A., assistant; CHEREPKO, P.A.,  
 dotsent. SUSHINSKIY, A.F., inzh., retsentsent; MEN'SHIYOV, P.N.,  
 red.; SUBBOTINA, G.M., tekhn.red.

[Manual for rural builders] Spravochnik proizvoditelia rabot  
 sel'skokhoziaistvennogo stroitel'stva. Novosibirsk, Novosibirskoe  
 knizhnoe izd-vo. Vol.1. 1959. 673 p. Vol.2. 1959. 677-1191 p.  
 (MIRA 13:2)

(Farm buildings)



PARAMONOV, G.A., inzh.; PICHUGIN, A.A., kand.tekhn.nauk; VANNYEV, V.A.,  
inzh.; KUZ'MINSKIY, A.G., inzh.; CHUYKO, A.V., kand.tekhn.nauk;  
VRUBLEVSKIY, L.Ye., inzh.; FURMAN, A.Ya., inzh. [deceased];  
PEGOANOV, G.N., inzh.; SHEFANOV, A.S., inzh.; DMITRIYEV, P.A.,  
kand.tekhn.nauk; IVANOV, I.A., kand.tekhn.nauk; TEMKO, Yu.P.,  
dotsent; SOKOLOV, P.K., dotsent; KANYUKA, N.S., kand.tekhn.nauk;  
SHPAKOVSKAYA, L.I., red.; GOSTISHCHEVA, Ye.M., tekhn.red.

[Handbook for the master builder on the technology of general  
building operations] Spravochnik mastera-stroitel'ia po tekhnologii  
proizvodstva obshchestroitel'nykh rabot. 2. izd.perer. i dop.  
Novosibirsk, Novosibirskoe knizhnoe izd-vo, 1961. 713 p.

(MIRA 15:2)

(Building)

KUZ'MINSKIY, A.N., inzh.

Improving the methods for calculating the cost of castings.  
Mashinostroenie no.6:94-96 N-D '63. (MIRA 16:12)

KUZ'MINSKIY, A.N., inzh.; RYMAR, Yu.Ya., inzh.; NAKONECHNIY, S.I., inzh.

Mathematical method for calculating optimum charge. Mashinostroenie  
no.3:48-50 My-Je '64.

(MIRA 17:11)

KUZMINSKIY, A.P., gvardii starshiy leytenant; KOSHELEV, V.G., gvardii starshiy leytenant; YARTSEV, P.M., gvardii starshiy leytenant.

We learn the art of flying from our commanding officers. Vest.  
Vozd. Fl. 41 no.12:32-35 D '58. (MIRA 11:12)  
(Flight training)

KUZ'MINSKIY, A. S.

Epidemiology of an outbreak of listerellosis. Zhur.mikrobiol., epid.  
i immun. 27 no.8:25-30 Ag '56. (MLRA 9:10)

1. Iz sanitarno-epidemiologicheskogo otryada.  
(*LISTERIA*, infections,  
epidemic in Russia (Rus))

GUDKOVA, Ye.I., MIRONOVA, K.A., KUZ'MINSKIY, A.S., GEYNE, G.O.

Second outbreak of listerellal anginas in a populated area.

Zhur.mikrobiol. epid. i immun. 29 no.9:24-28 S'58

(MIRA 11:10)

1. Iz Instituta ukha, gorla, i nosa.  
(TONSILLITIS, epidemiology,  
in Russia, caused by Listeria (Rus))  
(LISTERIA, infections,  
tonsillitis, epidemiol. in Russia (Rus))

*ca*

Oxidation of rubberlike polymers. A. S. Kus'minskii  
Doklady Akad. Nauk SSSR, 1964, No. 10, p. 225-24 (1964).—Review.  
F. H. Rathmann

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ASB-SLA METALLURGICAL LITERATURE CLASSIFICATION

ROOM DIVISION

100000 + J

SUBJECT INDEX

DATE

REMARKS

CLASSIFIED BY

REVIEWED BY

AKUZMINSKIY, A. S.

Oxidation of polydienes. I. Methods of studying the kinetics of oxidation of rubber. A. S. Kuz'minskiy, L. L. Shanin, T. G. Degteva, and K. A. Lapteva. *Kolloid. Zhur.* 9, 374-40 (1947). —The rubber films were spread on a glass frame which then was suspended on a spring balance recording 0.5 mg. The balance hung in a tube which could be connected with a system of  $O_2$  circulating at a const. pressure so that the degree of oxidation was detd. by both the increase in wt. of the rubber and the decrease in vol. of the  $O_2$ . The volatile reaction products present in the circulating  $O_2$  were condensed in traps cooled with liquid air; these traps were disconnected from the app., emptied, and connected again without interrupting the circulation. After the expt. the peroxide  $O$ , the degree of unsatn., the no. of free  $CO_2H$  groups and the no. of esterified  $CO_2H$  groups were detd. in the oxidized rubber with  $KI$ ,  $ICl$ , 0.1  $N$  alc.  $NaOH$  in the cold, and 0.1  $N$  alc.  $NaOH$  at 70°, resp. For detg. the d. of the rubber a special pycnometer was constructed (illustrated). The swelling capacity was detd. by immersing a sample in benzene for several hrs., measuring the gradual loss of wt. of the sample in air on a spring balance, and extrapolating the 2nd (linear) portion of the curve to the origin of the time axis. The error of this method is  $\approx 5\%$  or less. The rubber was extd. with  $CHCl_3$  in the absence of air. Its mech. properties also were detd. The rubber film must be thinner than 0.01 cm. for Na butadiene polymers to avoid the effects of  $O_2$  diffusion in the film. II. Change of the chemical properties of sodium-butadiene rubber on

oxidation with molecular oxygen. *Ibid.* 10, 26-32 (1948). —Heating polybutadiene (I) films in a high vacuum lowers their degree of unsatn.,  $N$ , e.g., by 16% within 1 hr. at 100°. When I is heated in  $O_2$ , addn. of  $O$  starts after a latent period  $t$  which is almost independent of the  $O$  pressure  $P$  (150-700 mm. Hg), but is smaller the higher the temp. (6 hrs. at 80°, less than 1 hr. at 110°). After  $t$ , the rate of oxidation  $r$  increases about twice between 80 and 90° and about 1.3 times between 100 and 110°, and also slightly increases with  $P$ , and then falls when the limit  $L$  of oxidation is near;  $L$  is almost independent of temp. (0.3 g.  $O$  per 1 g. I). At 100° and 760 mm. Hg,  $r = 0.000275$  c.t. (in millimol.  $O$  per 51 g. I per hr.),  $c$  is the concn. of peroxide  $O$  in millimol. per 51 g. I. Addn. of styrene to butadiene increases  $t$  and  $L$ . The  $\Delta$  increase of  $I$  during oxidation is equal to the amt.  $x$  of  $O$  consumed, but oxidation produces volatile substances which can be isolated when  $O$  circulates through the reaction vessel and a cold trap. The amt. of volatile substances is approx. 0.23  $x$  at low  $x$  and 0.35  $x$  at large  $x$ . The oxidized polymer contains  $CO_2H$  groups whose no. increases with  $x$  less rapidly than  $N$  decreases. A part of it (e.g., 16%) is sol. in  $CHCl_3$ . III. Change of physical properties of sodium-butadiene rubber during oxidation with molecular oxygen. A. S. Kuz'minskiy and L. L. Shanin. *Ibid.* 212-17. —When 100 parts Na-butadiene rubber (I) took up 17 parts  $O$ , the d. increased from 0.896 to 1.109. When 21

30



Rubber Abstracts

Crude Natural Rubber

Oxidation of polydienes. II. Changes in chemical properties of sodium butadiene rubber during oxidation with molecular oxygen. A. S. KUMINSKY, L. L. SHANIN, T. G. DUDNYA, and K. A. LARINA (Colloid J., U.S.S.R., 1949, 10, 26-32; Brit. Abstr., 1949, 11, 100). The thermal oxidation of sodium butadiene polymer and of copolymers of butadiene and styrene at different pressures and temperature proceeds very irregularly. Even at the beginning there is observed the formation of volatile products and carboxylic acids; they distill completely in a vacuum of  $10^{-6}$  mm. of mercury at 60° C. without observable decomposition. Oxidation of copolymers of butadiene and styrene in different proportions shows that under similar conditions the inductive period is longer the smaller is the amount of double bond character. In all cases, temperature sharply affects the inductive period and maximum oxidation velocity, but does not affect appreciably the total oxygen consumed. It is shown that the heating of sodium butadiene rubber in a high vacuum at 100° leads to a fall in the unsaturation which seems to be the result of structural change. An empirical relation is given relating the velocity of oxidation with the concentration of peroxides.

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1949

KUZ'MINSKIY, A. S.

FA 7877

USSR/Chemistry - Rubber, Oxidation of May/Jun 1948  
Chemistry - Rubber, Properties of

"Research in the Field of the Oxidation of Polydienes,  
III, Variation in the Physical Properties of Na-  
butadiene Rubber During Oxidation by Molecular Oxy-  
gen," A. S. Kuz'minskiy, L. L. Shanin, Moscow Inst  
of Fine Chem Tech imeni M. V. Lomonosov; Phys. Chem  
Inst imeni L. Ya. Karpov, Moscow, 6 pp

"Kolloid Zhur" Vol X, No 3

Experimental data illustrate the changes of the  
mechanical and colloidchemical properties of Na-  
butadiene rubber during oxidation. Submitted 5 Feb  
1947.

7877

KUZ'NINSKIY, A. S.

PA 9/49 T11

USSR/Chemistry - 1, 3 Butadiene,  
Polymers With Sodium  
Chemistry - Oxidation  
Jun 48

"Kinetics of the Thermal Oxidation of Sodium-  
Butadiene Polymer," A. S. Kuz'Ninskiy, Phys-  
Chem Inst Inzhn Kerpov, Lab of Polymerization  
Processes, and Moscow Inst for Fine Chem Tech,  
52 pp

"Zhur Obshch Khim" Vol XVIII (1944), No 6

Investigates oxidation kinetics of sodium-butadiene  
polymer in solid phase. Describes method for study-  
ing kinetics of oxidation and oxygen sorption by

9/49T11

USSR/Chemistry - 1, 3 Butadiene (Contd) Jun 48

polymers. Process can be divided into two station-  
ary ones, first of which is due to thermal acti-  
vation of polymer, second to utilization of energy of  
decomposition of peroxide. Both lead to formation  
of peroxides, accumulation of which causes auto-  
catalytic character of reaction  $K_1$  and  $K_2$  which  
varies with temperature according to Arrhenius'  
law. Energy of activation for first process  
 $E_1 = 26$  kg calories and for second process  $E_2 =$   
17 kg calories. Submitted 5 Oct 1946.

9/49T11

KUZMINSKIY, A. S.

Mechanism of oxidation of amide rubber A. S.

Let us consider the effect of the concentration of the oxidant on the rate of oxidation of amide rubber A. S.

It is known that the rate of oxidation of amide rubber A. S. increases with an increase in the concentration of the oxidant.

showing that at a certain concentration of the oxidant the rate of polymerization rises sharply. It is known that the rate of polymerization of amide rubber A. S. increases with an increase in the concentration of the oxidant. It is also known that the rate of polymerization of amide rubber A. S. increases with an increase in the concentration of the oxidant. It is also known that the rate of polymerization of amide rubber A. S. increases with an increase in the concentration of the oxidant.

of the probable reaction courses are supposed to be M. S.

KUZNETSOV, A. S.

Chemistry - Butadiene  
Chemistry - Oxidation

Apr 49

"Studies of the Mechanism Whereby  $\alpha$ -Butadiene  
Polymers are Oxidized," A. S. Kuznetsov, T. O.  
Dobrova, I. A. Lapteva, Moscow Inst of Fine Chem  
Technol Issui N. V. Lomonosov, 164 pp

"Zhur Prikl Khim" Vol XIII, No 4

Shows that oxygen taking part in all stages of the  
reaction is contained chiefly in peroxides, acids,  
and ethers. Studies oxidation of polymers and  
accumulation of intermediates and end products for  
different temperatures. Also diagrams concurrent

60/49226

Chemistry - Butadiene (Contd)

Apr 49

oxidation and polymerization which are expanded,  
generally into primary-chain and secondary-chain  
double bonds, respectively. Submitted 10 May 49.

60/49226

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**Mechanism of the oxidation of sodium-butadiene polymer.** A. S. Kus'minskii, T. G. Degtyeva, and R. A. Lapteva (Moscow Inst. Fine Chem. Technol.). *Zhur. Priklad. Khim.* (J. Applied Chem.) 22, 423-30 (1949); *cf. C.A.* 43, 924/.—The kinetics of the oxidation and the relation between oxidative decomposition and accompanying polymerization of Na-butadiene polymer (I) were studied. I was purified by 2 pptns. from benzene soln. by EtOH, soln. in benzene, recovery as film on a water surface, and removal of absorbed benzene and H<sub>2</sub>O in high vacuum; the max. thickness of films was 33-4.7  $\mu$ . All expts. were conducted in an app. that excluded oxidation by atm. (1). Properties of I are: mol. wt. 181,000 (viscometry); 14% of theory (bromimetric); no. of double bonds unsatn. 96% of the total (osonolytic); tensile in side chains 90% of the total (osonolytic); strength 8.69 kg./sq. cm., sp. gr. 0.89. Graphs and tables illustrate new findings: (1) Oxidation of I at 80-100° gives solid, liquid, and gaseous products (H<sub>2</sub>CO and HCOOH) called "volatiles" (II); total formation of II increases with temp. At max. rate of formation the thermal coeff. is 1.75, whereas that for the oxidation is 1.81. II are formed chiefly by oxidative decompos. of I and the loss of unsatn. do not change when II are removed from the reaction medium. (2) Osomolysis expts. showed that the double bonds of main and side chains are not of the same reactivity, and their ratio must be considered when studying oxidation of this type of polymer. (3) When carbonyl compds. (H<sub>2</sub>O or Ph<sub>2</sub>CO) were introduced into the reaction medium (1%), no effect was ob-

served. (4) Carbonylic acids, formed by oxidative decompos. of I, were found in the insol. (solid), sol., and volatile phases. Decrease in soly. in the beginning stages of oxidation is accompanied by an increase in the concn. of acids. At const. reaction rate the amt. of sol. products and acids is const., and when the reaction dies off, the soly. and acid concn. decrease. The sol. products are low-mol.-wt. fragments of main polymer chains. Some esters are also formed. (5) At 100° in the beginning of oxidation unsatn. decreases fastest, and its loss is greater than calcd. for  $\chi_2$  absorption; at 80-100° its loss is less than calcd.; in the interval of 0.020 to 0.20 mole  $\chi_2$ /mole absorption there is at all temps. a linear relation between  $\chi_2$  absorption and loss of unsatn. When I is heated in vacuum or in an O<sub>2</sub> atm. at 100°, a decrease of unsatn. up to 20% takes place during the 1st hr. Near 100° loss of unsatn. also takes place at side chains of I. This leads to a lowering of soly. in org. solvents and an enhancement in strength and elasticity. (6) Preliminary polymerization in high vacuum at 100° does not affect the oxidation process. (7) Increase of oxidation rate is in direct proportion to the accumulation of stable peroxy compds. in the system. (8) Oxidation proceeds by a reaction of aldehyde radicals with O<sub>2</sub> and polymerization by a reaction of the radicals with double bonds. Both processes have approx. the same activation energy (5-6 cal.). The no. of collisions depends little on temp. during oxidation, but greatly so during polymerization. (9) Oxidation takes place mainly at the double bonds of the main chain, polymerization at those of side chains.   
 KITE LUC

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A.S. KUZ'MINSKIY

Oxidation of the sodium butadiene polymer in the presence of phenyl-8-naphthylamine. A. S. Kuz'minskiy and N. N. Koshchey (Sci. Research Inst. Polymer Phys. Ministry Chem. Ind.). Doklady Akad. Nauk S.S.S.R. 66: 557-560 (1979); cf. C.A. 44, 17837. Introduction of phenyl-8-naphthylamine (I) stops the oxidation of the polymer at [I] and gives rise to a new induction period during which I is consumed, and at the end of which oxidation recurs; extn. of the inhibitor with MeOH suppresses the induction period. By both photoelectrochrometric and ultraviolet-absorption kinetic data, with a better than 5-10% agreement between the 2 methods, the rate of disappearance of I, added to 30-40% films of the polymer, was const. over the whole induction period of the oxidation. From expts. with 50, 25, and 12.5 millimoles/l. polymer at 120°, and with a const. 12.5 millimoles/l. polymer at 120° and 130°, the rate of consumption of I is independent of its initial concn. but increases with the temp. If the action of I consists in a reaction with the active centers produced by addn. of O<sub>2</sub>, and, thus, rupture of the chains, the rate of that step is  $-d\delta/dt = k_2\delta n$ , where  $\delta$  = concn. of I,  $n$  = concn. of the active centers produced by  $O_2 + O_2 \rightarrow n$  (where  $n$  = polymer), at the const. rate  $+dn/dt = k_1$ . The constancy of the rate of consumption of I means  $k_1 = k_2\delta n$ , i.e. the concn. of the active centers  $n$  is at any moment inversely proportional to the concn.  $\delta$  of I. If, in analogy to the slow oxidation of hydrocarbons, the rate of the chain process  $W$  is, according to Medvedev and Pod'yapolskaya (C.A. 54, 17797), the sum of the rate  $W_1$  of the process due to activation of the initial substance, and the rate  $W_2$  of the process proceeding over peroxides, then evidently,  $W_1 = k_1$ , and, if the total  $W$  is detd. by the exptl. consumption of O<sub>2</sub>, it is possible to calc.  $W_2$ , which, on the other hand, is  $W_2 = k_2 [II] [P]$ , where  $II$  = peroxide. The chain length being  $\gamma = W/(-dn/dt)$ , it is, for the 1st process,  $\gamma_1 = W_1/k_1 = 1$ , during the induction period. Exptl. values of the consts. (in mol./l. sec.) for the Na butadiene polymer, are, at 90 and 100°,  $10^3 W = 0.90$  and  $1.61$ ,  $10^3 W_1 = 0.13$  and  $0.30$ ,  $10^3 W_2 = 0.90$  and  $1.61$ ,  $10^3 k_1 = 0.13$  and  $0.30$ ,  $10^3 k_2 =$

0.043 and 0.119. Rates of initiation of the polymer in the induction period, at 90, 100, 110, 120, and 130°, are 0.13, 0.30, 0.64, 2.64, and 4.70 ( $\times 10^{-7}$ ). The activation energy in that temp. interval is 22.5 kcal. N. Thon

KUZ'MINSKIY, A. S.

Doc Chem Sci

Dissertation: "Investigation of the Mechanism of Thermal Oxidation of Rubber."  
25/12/50

Moscow Inst of Fine Chemical Technology imeni M. V. Lomonosov

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Sum 71



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"APPROVED FOR RELEASE: 06/19/2000

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NOTE: WITH THE extrapolated value is ----

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CA

The kinetics of oxidation of sodium-butadiene polymer in the presence of phenyl-2-naphthylamine. A. S. Kuz'minskii and N. N. Lezhnev (Inst. Rubber Ind., Moscow). *Zhur. Fiz. Khim.* 24, 580-59 (1950); cf. C.I. 44, 2347c. — Na-butadiene rubber (I) was freed from anti-oxidants and dissolved in 30 parts  $C_6H_6$ . Then  $x$  parts of  $C_6H_5NHNHPh$  (II), dissolved in  $C_6H_6$ , was added, and a film of 20 sq. cm. was made by evapn. of benzene and kept in  $O_2$  at  $T^\circ$  for  $t$  hrs. (cf. C.I. 43, 923f). The amt.  $p$  of the unchanged II was detd. in the MeOH ext. of the film spectrographically or by coupling with diazotized  $p$ - $O_2$ - $NC_6H_4NH_2$  and by photocolourimetry. The bound II was detd. (mikro-Kjeldahl) in the rest of the film. The decrease of  $p$  on increasing  $t$  was linear and almost independent of  $x$  (0.001-0.011). At 100, 110, 120, and 130°,  $dp/dt$  was about 0.004, 0.007, 0.01, and 0.01 mg. per hr. when the original amt. was 0.30 mg. ( $x$  was 0.00275). In all instances the induction period of the oxidation of the film ended when  $p$  was almost zero. The amt. of the bound II in the  $C_6H_6$ -insol. part of the film increased with  $t$  at the same rate as  $p$ . At the end of the induction period  $p$  was 0.55-0.7 part. The rate of oxidation of I is  $a + bFP$ ;  $P$  is the concn. of the unoxidized I and  $p$  is the concn. of peroxide  $O_2$ . The consts.  $a$  and  $b$  were, e.g., at 100°  $3 \times 10^{-6}$  and  $119 \times 10^{-6}$  if the rate is in g. mol. per l.-sec.;  $a$  represents the rate of activation of I mol.; the term  $bFP$  owing to catalysis by peroxides is much greater. The activation energy of the inhibited oxidation of I was 22,600 cal. between 100 and 130°. J. I. Burkman

CA

**Structure of rubbers and their reactivity.** A. S. Kur'minskii and N. N. Lezhnev. *Doklady Akad. Nauk S.S.S.R.* 70, 1021-4 (1959).--By detns. of the rates of autoxidation in  $O_2$  of a gutta-percha hydrocarbon (I), natural rubber hydrocarbon (II), butadiene-styrene rubber (III), a butadiene rubber with 80% double bonds in the main chain (IV), and a butadiene rubber with 20% double bonds in the main chain (V), the consumption of the inhibitor, phenyl- $\beta$ -naphthylamine, added in the initial amt. of 12.5 millimoles/mole rubber, is a linear function of the time, i.e., the rate is const., and decreases in the above order. The rates of the autocatalytic fixation of  $O_2$  after consumption of the inhibitor follow the same order. Consequently, the oxidizability of a rubber is detd. not by the length of the mol. chain, spatial configuration, or presence of aromatic rings, but solely by the no. of double bonds in the principal chain. The rate of consumption of inhibitor corresponds to the rate of the primary act of initiation of oxidation. Rates (w) and rate consts. (k) of the initiation, calcd. from the inhibition rate data, at 120 and 130°.

are: (I)  $10^4 w = 10.10$  and  $21.01$ ,  $10^4 k = 177.2$  and  $334.0$ , (II)  $10.04$  and  $20.31$ ,  $170.1$  and  $357.3$ , (III)  $8.70$  and  $18.77$ ,  $122.8$  and  $257.3$ , (IV)  $8.10$  and  $18.20$ ,  $112.5$  and  $258.3$ , (V)  $2.31$  and  $4.70$ ,  $33.0$  and  $60.0$ . At any temp., w or k is a linear function of the double-bond content in the principal chain. This influence predominates over the possible effects of all other factors; in particular, the mol. wt. or the configuration seems to play no role. The activation energy for the binding of  $O_2$  by a double bond of the principal chain is 21.3 kcal. per mole for all the rubbers investigated. Double bonds in the side chains are practically inert during the stage of consumption of inhibitor, and undergo some oxidation only at the stage of autocatalytic union of  $O_2$ , with an activation energy of 26.8 kcal. per mole. For the nearly solid Butyl rubber, the rate of consumption of inhibitor is represented by a broken line. Initially, the mol. reacts with  $O_2$  faster at simple than at double bonds; as soon as a const. mol. wt. is attained, oxidation proceeds at a slower rate mainly at the double bonds of the principal chain. Apparently long chains react earlier than short chains. In all cases, double bonds in the principal chain are considerably more reactive than

in the side chains. This applies not only to reaction with  $O_2$ , but also with ozone and mang. acids. N. From

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CH

**Mechanical activation of rubbers (oxidation under mechanical stress).** A. S. Kur'minskii, M. G. Matrel', and N. N. Leshnev (Sci. Research Inst. Rubber Ind., Ministry Chem. Ind. U.S.S.R.). *Doklady Akad. Nauk S.S.S.R.* 71, 310-22 (1950).—Oxidation, at 123 and 143° of a vulcanizate of styrene-butadiene copolymer 90.0%, tetramethylthiuram disulfide 3%, ZnO 1%, and phenyl- $\beta$ -naphthylamine (inhibitor) 0.4%, subjected to fatigue under an alternating stress of const. frequency, 250 cycles per min., and a const. amplitude of 50%, proceeds at the induction stage of consumption of the inhibitor at a const. rate, which is markedly greater than the rate of purely thermal inhibited oxidation at the same temp. The difference of the 2 rates represents the initial oxidation rate due to stress. At const. temp., 123°, and frequency (250 per min.), the rate of consumption of the inhibitor increases linearly with the amplitude (25, 50, and 75%). and, at const. temp., 123°, and amplitude (50%), it increases linearly with the frequency (250 and 500 per min.). The activation energy of the thermal oxidation without stress is 21; under stress (250 per min., 50%) it is only 18.1 kcal. per mole; the difference, 3 kcal. per mole, represents the gain in activation energy due to the stress. On the other hand, under the same conditions, the activation energy corresponding to purely mech. activation, is calcd. to be 16 kcal. per mole. This figure excludes the interpretation of the stress activation of the oxidation by simple mech. rupture of mols., as this would give rise to free radicals, reacting with O with an activation energy of 5-8 kcal. per mole. Except in the presence of O, mech. fatigue does not result in significant rupture of mols. The effect of fatigue in the presence of O is illustrated by the following data of the total no. of cycles (250 per min., amplitude 50%) necessary to bring about rupture: at 23, 40, 60, 80, and 100°, in O, 90, 45, 20, 7, and 2; in N<sub>2</sub>, 160, 100, 30, 105, and 210. ... N. Thon

CA

11

**Nature of the structural changes in butadiene rubbers by the action of high temperatures.** A. S. Kur'minskii, I. A. Shokhin, and R. M. Belitskaya. *Doklady Akad. Nauk S.S.S.R.* 74, 725-7(1950).—Under conditions of rigorous exclusion of O on heating in a high vacuum at 200°, the double bond content *D* in the lateral chains falls linearly with time, the faster the higher the initial *D*; in 2 different samples of butadiene rubbers, *D* fell in 12 hrs. from 83 to 80%, and from 80 to 40%, resp. On heating in N at 120 and 200°, the inhibitor (phenyl- $\beta$ -naphthylamine) is consumed only in the initial stages. That this initial consumption does not depend on the different reactivities of the double bonds in the main and the side chains is demonstrated by the identity of its kinetic curves for samples with different distributions of the double bonds between the main and side chains. On the other hand, admission of a small amt. of O after the consumption of the inhibitor has come to a halt gives rise to renewed fall of the inhibitor content. Consequently, the initial consumption of the inhibitor is due to the presence of traces of O in the rubber. The linear increase in the modulus of elasticity with time of heating goes on far beyond the cessation of the consumption of the inhibitor.

N. Thon

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CA

Effect of sulfur on the oxidation of sodium-butadiene rubber. A. S. Kus'minskii, T. G. Degteva, K. A. Lapteva, and N. N. Lezhnev. *Doklady Akad. Nauk S.S.S.R.* 75, 223-4 (1960).—Free, i.e., unbound, S inhibits oxidation, with the inhibition increasing with the S content (0.08–0.61%). If S is introduced during autocatalysis, the latter is not suppressed but is considerably slowed down. The deceleration of the absorption of  $O_2$  is due to interaction of S with the intermediate oxidation products of the rubber; in this process, free S is progressively bound, and, by extn. analysis, its amt. is shown to decrease linearly with time, i.e. at a const. rate. Thus, at 90°, the free S decreased from an initial 0.3% (0.084 M per l.) to zero in 9 hrs. when the amt. of  $O_2$  absorbed was 140 millimoles per mole rubber. In the presence of S, the amt. of volatile products ( $HCO_2H + HCHO$ ) is reduced, with the ratio  $HCO_2H/HCHO$  remaining unchanged. Further, in the presence of S the equil. concn. of the intermediate peroxides, i.e., the equil. concn. of free radicals, is reduced. Introduction of S results in considerable structure formation (i.e. decrease of the initial unsatn.) even in a  $N_2$  atm.; whereas without S, in vacuo, there is no structure formation; at 90° with S, unsatn. decreases by 16%, without a concomitant binding of S; at 143°, a small amt. of S is bound in this process, owing probably to traces of  $O_2$ . It is the free radicals, initiated by  $O_2$ , that are apt to react further either with  $O_2$  or with S or with the double bonds of the rubber, unless and until they are inactivated by recombination or otherwise.

Comparison of the activation energies of the primary act of blading of  $O_2$  at double bonds of the main chain, 22.6 kcal. per mole (1 mole of rubber being defined by the presence of 1 aliphatic double bond) and of vulcanisation, 37 kcal. per mole, confirms that the rate of the reaction with rubber is much greater than with S; the latter forms with rubber no intermediates of the type of peroxides. Chain lengths, detd. from the stationary stages of the oxidation, where the rates of formation and of decompos. of the peroxides are equal, and the ratio of the rates of expenditure of  $O_2$  on the chain reaction and of the decompos. of the peroxides gives the chain length, are found, at 90°, 3.1 in the absence of S, and 1.8 with 0.2% S introduced. Hence, the rupture const.  $\sigma$  are, for  $O_2$  and S,  $\sim 1000$  and  $\sim 62$ , resp., i.e. at equal concns. of  $O_2$  and S the probability of chain rupture on S is  $1/16$  that on  $O_2$ . However, inasmuch as with 0.2% S added, its initial concn. is about 23 times that of the dissolved  $O_2$ , the initial probabilities of chain rupture on  $O_2$  and S come out approx. even. For a true inhibitor, such as phenyl- $\beta$ -naphthylamine,  $\sigma$  is of the order  $10^4$ , i.e. by  $\sim 10^4$ – $10^5$  greater than for S. The rate equation of the autocatalytic oxidation of rubber (C.A. 44, 9181f),  $w = k_1[I][P]$ , where  $P$  = peroxides, and  $I$  = double bonds (with  $k_1$  including the rate const. of the interaction between the radicals and  $O_2$ , and the ratio of the equil. concn. of peroxides and radicals, in the denominator, the sum of the rupture probabilities on  $O_2$  and/or S), needs to be corrected for secondary reactions. Empirically, this correction amounts to a factor  $(1 - \alpha[Q]^{-1/2})^{-1}$ , where the const.  $\alpha$  depends on the temp. and  $Q$  is the  $O_2$  bound by the rubber. The corrected rate  $w$ , at 90°, is then  $w = 8.68 \times 10^{-4}[I][P]/(4.3 + 16[S])$  ( $1 - 0.2[Q]^{-1/2}$ ). Rates calcd. with the aid of this equation cotacade very satisfactorily with the expl. curve of  $Q$  as a function of time. N. Thom

1457



27

OTR

7992\* The Aging of Latex and Vulcanization. (In Russian) A. S. Kuzminskii and N. N. Lezhnev. *Latexyua Promyshlennost*, v. 11, Nov. 1951, p. 25-28.  
Influence of several factors on the above. Graphs.

A

5

Alteration of the mechanical properties of sodium-butadiene rubber caused by light. Yu. S. Zuev and A. S. Kuz'minskii. *Kolloid. Zhur.* 13, 436-43 (1951); cf. C.I. 43, 2230. —Na-butadiene rubber (I) films, about 0.01 cm. thick, were extended by loads which diminished when the films stretched so that  $t \cdot \sigma$  real stress  $\sigma$  remained const.  $\log \epsilon$  ( $\epsilon$  = deformation) increased linearly with  $\log t$  ( $t$  = time) and the coeff. of proportionality  $m$  was independent of  $\sigma$  when this varied from 200 to 455 g./sq. cm. Illumination of I in N (app. is pictured) lowered  $m$  (e.g., from 0.28 to 0.10 within 1 hr.) and increased the viscosity  $\eta$  of the after-effect (e.g., from  $38 \times 10^7$  to  $100 \times 10^7$  poises) and the initial high elastic modulus of elasticity ( $E'$ ) (e.g., from 0.5 to 2.4 kg./sq. cm.). Interception of light shorter than 2967 Å. by a glass screen retarded these changes; e.g.,  $m = 0.10$  was reached within 8 hrs. and  $\eta$  after 1 hr. was  $39 \times 10^7$ . Addn. of 1% phenyl- $\alpha$ -naphthylamine retarded the changes in full light, — but in some cases accelerated them in light  $> 2967$  Å.; thus  $\eta$  after 1 hr. was  $150 \times 10^7$  and  $52 \times 10^7$ , resp. In all conditions,  $\eta$ ,  $E'$  first decreased and then increased during illumination.

J. J. Lukerman

CA

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The structure of elastomers and their reactivity. A. S.  
Kuz'minskii and N. N. Lezhnev. *Rubber Chem. & Technol*  
24, 95 (1951). -See C.A. 44, 6182c. C. C. Davis

This image shows a microfiche card containing a document page. The card has a grid of circular frames along its edges. The central area contains a document page with a header "PROCESSES AND PROPERTIES INDEX" and a handwritten number "29". The main body of the document is a bibliographic entry starting with "9730\* The Mechanical Activation of Rubbers (Oxidation Under Mechanical Stress). A. S. Kuz'minskii, M. G. Maizels, and N. N. Leshnev. Rubber Chemistry and Technology, v. 24, Apr.-June 1951, p. 250-251 (Translated from Doklady Akade-mii Nauk SSSR [Reports of the Academy of Sciences of the USSR], new ser., v. 71, no. 2, 1950, p. 319-322) Previously abstracted from original." Below the main text is a section titled "METALLURGICAL LITERATURE CLASSIFICATION" which includes a table with columns for "SUBJECTS", "AUTHORS", and "PUBLICATIONS". The table lists various subjects like "STEEL", "IRON", "COPPER", etc., and their corresponding authors and publication details.

B

29

3510\* The Effect of Sulfur on the Oxidation of Sodium-Butadiene Rubbers. A. S. Kuzipinski, T. G. Degleva, K. A. Lapteva, and N. N. Lezhnev. *Rubber Chemistry and Technology*, v. 24, Oct.-Dec. 1951, p. 851-856. (Translated from *Doklady Akademii Nauk SSSR*, new ser., v. 75, No. 11, 1950, p. 221-226.)  
Previously abstracted from original.

CA

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Action of light on Buna rubber. A. P. Postovakaya and A. S. Kus'minskii. *Zhur. Fiz. Khim.* 25, 863-8 (1951). The structural changes of films of Na butadiene polymers following ultraviolet irradiation at 25° were studied as a function of the time of irradiation. The expts. were carried out in vacuo (10<sup>-6</sup> mm.) in order to eliminate the action of O<sub>2</sub>, and the gases evolved were collected and analyzed. The fraction of the latter which was not condensed at -180° was 85% of the total; its compn. was 64% H<sub>2</sub> and 32% C<sub>2</sub>H<sub>4</sub>. Thus C—C as well as C—H bonds are broken during the photoprocess, which has not a chain character as shown by the low quantum yield (2 × 10<sup>-4</sup>) calcd. on the basis of the amt. of light absorbed by the polymer (cf. Bateman, C.A. 41, 555d, where the quantum yield was detd. without measuring the absorption). The degree of unsat. of the polymer according to the method of Vasil'ev (C.A. 42, 293c) decreased during irradiation. From infrared spectra it is seen that the no. of double bonds in the main chains decreases markedly more rapidly than that in the side chains. The viscosity of the polymer in benzene soln. decreased, especially during the 1st hr. of irradiation. The solv. of the polymer also dropped with time, owing to the interaction of the free radicals produced as a result of rupture of the bonds.

Michel Boudart

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CA

Diffusion of oxygen and oxidation of rubber in the presence of phenyl-2-naphthylamine. A. S. Kuz'minski, L. I. Shanin, and N. N. Leshnev (Nauch.-Tekhn. Inst. Resinovol Prom. MKhP, S.S.S.R.). *Doklady Akad. Nauk S.S.S.R.* 79, 467-70 (1951).—Under const.  $O_2$  pressure  $p_0$ , the rate of oxidation (measured by the rate of consumption of the antioxidant phenyl-2-naphthylamine) of films of Na butadiene rubber 30-40  $\mu$  thick is const. With varying  $p_0$  (10-700 mm.), the rate  $w$  of the inhibited oxidation increases approx. proportionally to the square root of the concn.  $c$  of dissolved  $O_2$ ,  $w = k_0 c^{1/2}$ . The rate of oxidation  $w = f(c)$  and the diffusion coeff.  $D$  of the dissolved  $O_2$  are related by  $D(\partial^2 c / \partial x^2) = (\partial c / \partial t) + w$ , where  $x$  = distance from the

middle of the film. In the case of inhibited oxidation,  $D$  can be considered const. Solution of the above partial differential equation is difficult because the right-hand member is not linear. In its stead, the linear equation  $D(\partial^2 c / \partial x^2) = (\partial c / \partial t) + k_0 c^{1/2}$  is solved, with  $k_0$  detd. from the condition that the algebraic sum of the deviations of the approx. rate  $k_0 c^{1/2}$  from the actual rate  $k_0 c^{1/2}$  in the concn. range from zero to  $c$  should be zero. This gives, at 120°,  $k_0 = 8.18 \times 10^{-9}$  sec.<sup>-1</sup>. Solution of the linear equation gives  $c$  as a function of  $x$  and  $t$ . In a film 1 cm. thick, with both sides exposed to oxidation, stationary distribution of  $O_2$  over the thickness is established, at 120°, in 14 hrs., and in a film 0.1 cm. thick in 10-15 min. Practically, on account of the actual dependence of the rate on  $c^{1/2}$  (rather than on  $c$ ), stationary distribution is attained somewhat later. It can, however, be concluded that all-sided oxidation of films no thicker than 1.0 cm. takes

over

plus practically under conditions of stationary distribution of the concentration of  $U_2$ . Under these conditions,  $\partial U_2 / \partial x = 0$ ,  $U_2 = U_2^0$ , and  $x = 0$  is the surface of the film. The solution of the elliptic integral permits construction of the depth distribution of  $U_2$  at different stages of the oxidation. In a 1-cm. test, the rate of oxidation in the middle of the layer is about 85% of the rate at the surface, i.e. the oxidation is very nearly uniform over the whole thickness. This result is valid only for truly inhibited oxidation, in the absence of self-acceleration through chain reactions, in particular in the absence of such activation through deformation.



KUZ'NICKI, A. S.

4

Inhibited oxidation of rubbers. A. S. Kuz'minskii and N. N. Lezhnev. *Khim. i Fiz. Khim. Vysokomolekul. Soedinenii, Doklady 7-oi Konf. Vysokomolekul. Soedineniiyam 1952*, 90-8. The initiation of inhibited oxidation of rubbers is detd. by the disappearance of *N*-phenyl-2-naphthylamine (N according to Kjeldahl). The initiation reaction of this inhibited oxidation has an activation energy of 22.6 cal./mole for any polymer which does not contain electroneg. groups. The reactivity of the polymers to oxidation depends on the concn. of double bonds. The degree of polymerization, configuration of the chains, presence of aromatic rings, etc., have practically no influence on this rate. The reaction of O with double bonds in the side chains of butadiene rubbers has an activation energy of 27-8 cal./mole. The oxidation of polyisobutylene in the presence of *N*-phenyl-2-naphthylamine has a temp. threshold below which initiation does not take place. The inhibited oxidation of Butyl rubber is shown by oxidation of the polymer chains and addn. of O to the double bonds.

H. D. Noether

KUZ' MINSKIY, A. S.

(4)

Mechanical activation of the initiation of oxidation of rubbers. A. S. Kuz'minskiy, M. G. Malzel's, and N. N. Lezhnev. *Khim. i Fiz.-Khim. Vysokomolekul. Soedineni, Doklady i Konf. Vysokomolekul. Soedineniyam* 1952, 99-107. -- The effect of mech. activation (extension of rubber by 50% of its original length at 250 cycles/min.) on the inhibited oxidation of vulcanized and unvulcanized rubbers was detd. The activation energy of butadiene rubber to inhibited oxidation at 70-80° during mastication drops from 22.6 to 8.46 cal./mole, the activation energy of vulcanized butadiene-benzene rubber on mech. stretching (250 cycle/min.) at 123-143° drops from 21.0 to 18.1 cal./mole. At the same time the pre-exponential factor of the Arrhenius equation decreases. The destructive effect is due to the presence of O<sub>2</sub> since, in a N atm. at 20, 60, and 100°, the rubber is 2, 10, and 105 times as stable, resp., than with O present.

H. D. Noether

CA

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Changes of the mechanical properties of vulcanizates during the early stages of thermal oxidation. A. S. Kuz'minskii and L. I. Lyubchanskaya. *Kolloid. Zhur.* 14, 40 (1952); cf. C.A. 45, 10947d. Mixture of elastomer 100, tetramethylthiuram disulfide 3, stearic acid 1, ZnO 1, and phenyl-1-naphthylamine 0.5 part, were dissolved in C<sub>11</sub>H<sub>16</sub>, made to films (0.1-0.12 mm. thick) on Cellophane, and vulcanized at 143°. Such films of natural rubber (I) had an induction period (T) of oxidation at 90° equal to 70 hrs. Their tensile strength P (kg./sq. cm.), total elongation L, and modulus M (kg. wt./sq. cm.) decreased for the first 20 hrs. and remained almost const. (P = 30, L = 400%, M = 3) for the rest of T. When, then, autocatalytic oxidation started, P, L, and M decreased to zero within a few hrs. The T of divinylstyrene rubber (II) was 340 hrs. at 90° and 17 hrs. at 133°; P and M did not change during T at 90° but decreased at 133°; L was const. at both temps. The T of Na-butadiene rubber (III) was 27 hrs. at 133°. P rose during T from 100 to 140 and continued to rise during rapid oxidation; M also rose, while L decreased from 100 to 50%. Reduction of the concn. of the inhibitor from 0.5% to 0.25% had no effect on this behavior of III. The no. of cycles until rupture of II increased with the concn. of the inhibitor (113,000 at 0.25% and 255,000 at 1%). No ethers could be detected in III at the end of the induction period.

The rate of change of P, L, and M in III was greater than in II, although the rate of inhibited oxidation in II was greater than in III. Presumably the increase of P and M in III is due to the presence of 80% of the double bonds in side chains, while P and M of I decrease, since all the double bonds in I are in the main chain.

J. J. Bikerman

KUZNETSKIY, A. S.

232T17

USSR/Chemistry - Synthetic Rubber

Sep 52

"Kinetics of the Oxidation of Polyisobutene," A. S. KuznetSKIY, N. G. Koltova, Sci Research Inst of Rubber Production

"Zhur Obsch Khim" Vol 22, No 9, pp 1506-1516

The kinetics of inhibited and autocatalytic oxidation of polyisobutene and of butyl rubber were studied in the temp range of 110-130°. It was shown that the consumption of inhibitor and the decline in the mol wt of polyisobutene take place simultaneously. Both processes proceed up to a certain limit (depending on the temp) in the early stages of the reaction. The high-mol fractions are more reactive than the low. Initiation of oxidation of polyisobutene is due to thermal decomn of the mol chain forming its high-mol fraction. Initiation in butyl rubber is based on fission of C - C bonds, as well as oxidation of double bonds. Hence, the initiation rate is detd by 2 const (at 130° K =  $1.06 \times 10^{-7}$  moles/l/sec;  $K_1 = 0.14 \times 10^{-7}$  moles/l/sec) Free development of the oxidation process leads to thorough destruction of polyisobutene in the early stages of oxidation. A probable scheme for the oxidation mechanism of polyisobutene is given. On heating in high vacuum (with a low concn of oxygen), both polyisobutene and butyl rubber form more highly developed structures.

(3)

232T17

KUZMINSKY, A. S.

(4)

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1129. Effect of carbon blacks on the development of oxidation processes in raw and vulcanized rubbers. A. S. KUZMINSKY, L. I. LYUBCHANSKAYA, M. G. KUTKOVA, and S. I. BASS. Doklady Akad. Nauk S.S.S.R., 1952, 82, 131-3; Rubb. Chem. Technol., 1953, 26, 859-61. Cf. this journal, 1952, abs. 3423. A translation of this paper now appears. 431C0-R

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KUZ'MISKIY A. S.  
KUZ'MINSKIY

23876

USSR/Chemistry - Rubber

Feb 52

"The Mechanism of the Action of Oxidation Inhibitors in Rubber," A. S. Kuz'minskiy and L. G. Angert, Sci Res Inst of Rubber

"DAN SSSR" Vol 82, No 5, pp 747-750

An attempt was made to learn the mechanism of the action of inhibitors on the oxidation of rubber. Inhibitors used were phenyl-beta-naphthalamine and its derivs in natural rubber and sodium butadiene rubber. It was found that amine compds and oxy compds behave differently in respect to the stable rubber peroxides. While the

23876

First react with the peroxide radicals, the second decompose the stable peroxides thus formed. Since stable peroxides and peroxide radicals accumulate in the oxidation of rubber, using a combination of the above two classes of inhibitors will lead to a more complete repression of the oxidation. Presented by Acad P. A. Reblinder  
3 Dec 51

23876

KUZ'MINSKIY, A. S.

PA 234T7

USSR/Chemistry - Rubber, Vulcanization Accelerators 1 Mar 52

"The Joint Influence of Phenyl-beta-naphthalamine, Sulfur, and Vulcanization Accelerators on the Oxidation of Rubber," A. S. Kuz'minskiy, M. N. Lezhnev, Sci Res Inst of Rubber Production

"Dok Ak Nauk SSSR," Vol 83, No 1, pp 111-114

Sulfur and vulcanization accelerators have a great effect on the oxidation processes of rubber. These processes in turn have a great effect on the mech properties of the rubber.

234T7

Phenyl-beta-naphthalamine and sulfur were tested on sodium-butadiene rubber and curves showing the rate of consumption of each were plotted. It was shown that sulfur is consumed faster than phenyl-beta-naphthalamine. Presented by Acad P. A. Rebinder 11 Jan 52.

234T7

PA 239T24

ISSR/Chemistry - Rubber

"The Phenomenon of Autoinhibition During Oxidation of Butadiene-Nitrile Rubbers," A. S. Kuz'minsky and Ye. B. Popova, Sci-Res Inst of Rubber Production

Aug 52

"DAM SSSR" Vol 85, No 5, pp 1077-1080

The increased chem stability of butadiene-acrylonitrile rubbers is due to the fact that in the beginning stages of its oxidation, products arise which inhibit the further oxidation of the rubber. The investigation which led to this result

239T24

was carried out on SKM - 18 (20% of nitrile) SKM - 26 (29.6% of nitrile), and SKM - 40 (36% of nitrile) Submitted by Acad P. A. Rebindar 10 May 52.

239T24



KUZ'NENSKIY, A. S., PESHCHANSKAYA, R. YA.

Polymers and Polymerization

Oxidation of a polymer having a polar substitute at the double bond. Dokl. AN SSSR 85 No. 6, 1952.

Monthly List of Russian Accessions, Library of Congress, December 1952. UNCLASSIFIED.

KUZ'MINSKIY, A. S.

USSR/Chemistry - Synthetic Rubber

21 Oct 52

"The Connection Between Oxidation and Change in Structure of Butadiene-Styrene Rubber," N. N. Lezhnev, A. S. Kuz'minskiy, Sci Res Inst of Rubber Ind, Min of Chem Ind USSR

"Dok Ak Nauk SSSR" Vol 86, No 6, pp 1147-1150

A theoretical curve was calcd for the change in elasticity during oxidation at 100° of heat-vulcanized butadiene-styrene rubber contg 1% phenyl-beta-naphthalamine. Exptl data fit the curve satisfactorily and thus a connection is established between the chem

234T33

Process based on the decompn of active peroxide and the change in mech properties during the oxidation of rubber. Presented by Acad P. A. Rebindler 15 Aug 52.

234T33

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of certain para-subjects and for the first time

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The mechanical stresses caused by static deform-

**"APPROVED FOR RELEASE: 06/19/2000**

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polyisobutylene the rate of diffusion is



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**APPROVED FOR RELEASE: 06/19/2000**

**CIA-RDP86-00513R000928110005-5"**



KUZ'MINSKIY, A. S.

3  
✓ Simultaneous effects of phenyl- $\beta$ -naphthylamine, sulfur,  
and vulcanization accelerators on the oxidation of rubber.  
A. S. Kuz'minskiy and N. N. Leshnev (Scientific Research  
Inst. Rubber Ind., Moscow). Rubber Chem. & Technol. 26,  
352-5 (1953).—See C.A. 48, 8887i.

C. C. Davis

10-15-54

ml

KUZ'MINSKIY, A. S.

(3)  
Mechanism of the action of inhibitors of the oxidation of  
elastomers. A. S. Kuz'minskiy and L. G. Angey (Rubber  
Ind. Research Inst., Moscow). Rubber Chem. & Technol.  
26, 589-92(1953).—See C.A. 46, 6855i. C. C. Davis

10-15-54

my

KUZMINSKIY, A.S.

B. T. R.  
Vol. 3 No. 4  
Apr. 1954  
Rubber and Elastomers

5729\* Effect of Carbon Black on the Development of  
Oxidation Processes in Raw and Vulcanized Rubbers. A. S.  
Kuzminskii, L. I. Lyubchanskaya, N. G. Khitrova, and S. I.  
Bass. Rubber Chemistry and Technology, v. 28, Oct-Dec.  
1953, p. 858-881. (Translated from Doklady Akademii Nauk  
Soyuzo Sovetskikh Sotsialisticheskikh Republik, v. 85, no. 1,  
1952, p. 131-133.)

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KUZ'MINSKIY, A. S.

USSR/Chemistry - Rubber  
Mar 53

"The Disintegration of Stretched Rubber Under the Influence of Ozone," Yu. S. Zuyev, A. S. Kuz'minskiy, Sci-Res Inst of Rubber Industry

IAN SSSR, Vol 89, No 2, pp 325-328

Investigated surface cracking of rubber when stretched in an atm containing a small amount of ozone. The rubbers investigated were SKB (polybutadiene), SKS-30 (divinylstyrene), SKN-26 (divinylacrylic), and NK (natural rubber). The 3 conditions apparently necessary for cracks to appear on rubber as a result of the action of

264730

ozone are: (1) presence of centers of reactivity in the rubber (double bonds), (2) the presence of definite, directed stresses (stretching but no compression), and (3) specific nature of the chemical reaction between the rubber and the ozone, leading to a rupture of hydrocarbon chains with formation of an inelastic surface film if solid ozonides are present and characterized by the absence of diffusion of ozone into the depth of the sample. Presented by Acad P. A. Rebinder  
3 Feb 53.

KUZ' MINSKIY, A-S.

# USSR.

The kinetics of the oxidation of rubber under the influence of light. A. E. Podolskaya and A. S. Kuz'minskii. *Doklady Akad. Nauk S.S.S.R.* 90, 209-12 (1953).—The kinetics of the photooxidation of rubbers (Na butadiene, natural, and Butyl) was studied volumetrically, by the scheme described earlier (C.A. 46, 6873d). The curves of the amt. of O absorbed with time show that the rate of oxidation remains const. The photooxidation is compared with thermal oxidation. After 12 hrs., the decrease of the unsatn. was 85% for the photooxidation and only 6-8% for the thermal oxidation. An analysis of the solid phase of the oxidized rubber showed that 10-16% of the O was assocd. in the form of acids and complex esters, 40% was in the volatile products, 20% in the form of peroxides. No carbonyl groups or water were observed. J. Rovtar Leach

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KUZ'NISKIY, A. S.

4

(3)

Processes caused by the thermal breakdown of sulphur bonds in vulcanisates. A. S. Kuz'minskii and L. I. Lyubchanskaya (*Dokl. Akad. Nauk. SSSR*, 1983, 26, 409-412).—Vulcanisates containing the C-S<sub>2</sub>-C linkage oxidise at a lower rate than thermo-vulcanisates (C-C linkage only), indicating that S<sub>2</sub> free-radicals are oxidation inhibitors; they also inhibit the oxidation of phenyl-β-naphthylamine, apparently by the same mechanism (combination with oxidant). Monosulphidic bonds are too stable and so do not affect the oxidation of vulcanisates. Changes in the elastic modulus of vulcanisates containing the three types of bond, on heating at 130°, are discussed.

R. C. MURRAY.

KUZ'MINSKIY, A. S.

USSR/Chemistry - Vulcanizers

21 Jun 53

"Some Characteristics of the Light-Aging of Vulcanizers," Yu. S. Zuyev and A. S. Kuz'minskiy, Sci-Res Inst of the Rubber Industry

DAN SSSR, Vol 90, No 6, pp 1063-1066

Studied the effect of phenyl- $\beta$ -naphthylamine (I) on the light-aging of vulcanizers at different temps, different concs of (I), and with the introduction of light-filtering substances. At 25° (I) sensitizes the vulcanizer to light, but at 80° sensitization by I decreases. Raising the concn of I, results in the sensitizing action passing through a max.

269T7

Addition of a light-filtering substance, especially carbon black, has a strong effect on the relationship between aging by light and by heat. Presented by Acad P. A. Rebinder 21 Apr 53.





KUZ' MINSKIY, A. S.

62 ✓ The mechanical activation of oxidation of vulcanizates during static and multiple deformations. A. S. Kuz'minskiy and L. I. Lyubchanskaya. *Doklady Akad. Nauk S.S.S.R.* 93, 619-22 (1953).—The effects of static and multiple deformations were studied by the oxidation and destruction of vulcanizates. The oxidation was estd. by the amt. of phenyl-2-naphthylamine consumed when the article was kept under no stress, under static stress, and with multiple deformations. Mech. stretching was found to activate considerable oxidation, and the effect depended greatly on the nature of cross-bonding of the polymers, being greatest for C bonds, lower for monosulfide bonds, and least for polysulfide bonds.  
W. M. Sternberg...

①

KUZ'INSKIY, A-S.

CZECH

Deterioration of rubbers under stress by ozone. Yu. S.  
Zil'ev and A. S. Kuz'minskiy. Chem. Průmysl 4(29) 230-2  
(1964); cf. C.A. 43, 22506. L. A. Helwich

KUZ'INSKIY, A. S.

(3)  
Self-inhibition in the oxidation of butadiene-acrylonitrile  
rubbers. A. S. Kuz'minskii and E. N. Ponomareva (Scientific  
Research Inst. Rubber Ind., Moscow). Rubber Chem. &  
Technol. 26, 810-42 (1953). See C.A.B. 47, 1967d.  
C. C. Davis  
10-15-54  
ml

KUZ'MINSKIY, A. S.

3  
②  
Combined action of free and bound sulfur and *N*-phenyl-2-naphthylamine on the oxidation of vulcanizing agents. A. S. Kuz'minskiy and S. I. Bass. *Zhur. Priklad. Khim.* 27, 180-87 (1954).—The process of oxidative processes in rubber vulcanizates in the interval 80-130° was followed in connection with the effect of free and bound S. Free S is not only a weak but actually a harmful inhibitor, since, along with a very small lengthening of the induction period, it leads to intense addnl. structural formation of the vulcanizate. Bound (polysulfide) S in the absence of 2-C<sub>10</sub>H<sub>7</sub>NHPh (I) displays a definite inhibiting effect on oxidation. Free S hinders the protective action of I and is, therefore, harmful at high-temp. oxidation conditions; in addn. it calls for unnecessary and undesirable consumption of the amine and gives too short an induction period. In the presence of free S, autocatalytic oxidation of the vulcanizate develops, even with an amine concn. up to 40% of its original value; the amine which remains at the initiation of detectable O<sub>2</sub> absorption has less than 0.6 the inhibiting power in comparison with the pure amine. Bound S participates in the oxidative process along with the hydrocarbon part of the vulcanizate.  
G. M. Kosolapoff  
18-15-54

KUZ'NITSKIY, A. S.

USSR. Solubility of N-phenyl-2-naphthylamine in rubbers. S.  
A. Reibner and A. S. Kuz'minskiy. J. Appl. Chem.  
U.S.S.R. 27, 201-2(1954)(Engl. translation).--See C.A.  
49, 8577i. H. I. H. -- 61

KUZ'INSKIY, A. S.

2

Solubility of *N*-phenyl-2-naphthylamine in rubbers. S. A. Reitlinger and A. S. Kuz'minskiy. *Zhur. Priklad. Khim.* 27, 214-17 (1984).—The soly. of 2-C<sub>10</sub>H<sub>7</sub>NHPh in various types of rubber was detd. in thin films by the formation of films from C<sub>6</sub>H<sub>6</sub> solns. with increasing concn. of the amine. The soly. was detd. by slow heating of the film to a temp. at which the crystals (microscopic) disappeared completely. The results, shown graphically, are extrapolated to 20° giving the following soly. in millimoles per 100 g.: polyisobutylene 0.32, smoked-sheet rubber 1.91, polybutadiene 3.92, butadiene-styrene copolymer 3.28, butadiene-acrylonitrile copolymer 3.51, polychloroprene 8.67. Plots of log of soly. against reciprocal of abs. temp. give good straight lines. The calcd. heats of soln. of the above rubbers are -11,450, -10,050, -9700, -8100, -8500, and -8420 cal/mole, resp. G. M. Kosolapoff

11-9-54  
12/1

KUZ'MINSKIY, A. S.

USSR/Chemistry - Physical Chemistry

Card : 1/1

Authors : Kuz'minskiy, A. S. and Angert, L. G.

Title : Rubber oxidation inhibitors (connection between the structure of the molecule and the inhibitor effectiveness).

Periodical : Dokl. AN SSSR, 96, Ed. 6, 1187 - 1189, June 1954

Abstract : The relation between the mobility of amine hydrogen and the structure of an aramine molecule was investigated for the purpose of establishing the connection between the structure of the molecule and the effectiveness of rubber oxidation inhibitors. Analysis of experimental data shows that the rate of structural changes of vulcanized rubber during inhibited oxidation depends directly upon the strength of the N-H bond in the aramine molecule. The effectiveness of the inhibitor depends upon the rate of separation of the hydrogen from the molecule of the inhibitor. Four references. Graphs.

Institution : Scient. - Research Institute of the Rubber Industry

Presented by : Academician P. A. Rebinder, March 17, 1954

*KUZ' MINSKIY, A. S.*

USSR/Chemistry - Physical chemistry

Card 1/1 : Pub. 22 - 27/49

Authors : Kuz'minskiy, A. S.; Reytlinger, S. A.; and Shemastina, E. V.

Title : Diffusion of antioxidants in rubber

Periodical : Dok. AN SSSR 98/4, 611-612, Oct. 1, 1954

Abstract : The diffusion of certain solid antioxidants (phenyl-beta-naphthylamine, dinaphthylamine, and dinaphthylphenylenediamine) dissolved in rubber was investigated. Rubber, as a diffusion medium, is distinguished from liquid and solid crystalline bodies by the presence of certain characteristics due to the specificity of the thermal motion of the macromolecules. Since the investigated substances form colorless solutions in the rubber the position of the antioxidant concentration boundary was determined by the luminescence intensity of the filtered ultraviolet light. Three references: 1-USSR; 1-USA and 1-German (1942-1951). Graphs.

Institution : Scientific Research Institute of the Rubber Industry

Presented by : Academician P. A. Rebinder, May 22, 1954



USSR/Chemistry - Vulcanization

Card 1/1 Pub. 22 - 20/40

Authors : Kuz'minskiy, A. S., and Chertkova, V. F.

Title : ~~The role of oxygen during natural rubber vulcanization~~  
: The role of oxygen during natural rubber vulcanization

Periodical : Dok. AN SSSR 99/2, 261-263, Nov 11, 1954

Abstract : Data regarding the role of oxygen during the vulcanization of natural rubber are presented. The oxygen destruction of the rubber in conditions of press vulcanization are found to be of no great importance. The dissolved oxygen participates in the oxidation of the rubber, but the vulcanization process continues at a decreasing rate. An approximate calculation showed that the oxygen consumption per one hour of vulcanization is twenty times lower than during the vulcanization in the open air and the number of destructions is reduced considerably. The effect of anti-oxidants (secondary aromatic amines) on the properties of the rubber, formed during vulcanization, is explained. Eight USSR references (1946-1954). Table; graphs.

Institution : Scientific Research Institute of the Rubber Industry

Presented by: Academician V. A. Kargin, June 10, 1954

Kuz'minskiy, A. S.

USSR/Atomic and Molecular Physics - Physics of High Molecular Substances, D-9

Abst Journal: Referat Zhur - Fizika, No 12, 1956, 34514

Author: Kuz'minskiy, A. S.

Institution: None

Title: Present-Day Status of the Problem of Aging of Latex and Rubber

Original Periodical: Collection: Stareniye i utomleniye kauchukov i rezin i  
povysheniye ikh stoykosti [Aging and Fatigue of Latex and  
Rubber and Improving Their Stability], Leningrad, Goskhim-  
izdat, 1955, 3-16

Abstract: Survey

1 of 1

- 1 -

*Kuz'minskiy, A.S.*

USSR/Chemical Technology. Chemical Products and I-22  
Their Application--Crude rubbers, natural and  
synthetic. Vulcanized rubber.

Abs Jour: Ref Zhur-Khimiya, No 3, 1957, 9787

Author : Kuz'minskiy, A. S. and Angert, L. G.

Inst : ~~Not given~~

Title : The Function of Antioxidants in the Thermal Aging  
Process of Crude Rubber

Orig Pub: Sb.: Stareniye i utomleniye kauchukov i rezin i  
povysheniye ikh stoykosti, Leningrad, Goskhimizdat,  
1955, 17-30

Abstract: The inhibiting action of compounds of the type of  
the secondary amines, phenyl- $\beta$ -naphthylamine (I)  
and its derivatives:  $\alpha$ -methylphenyl- $\beta$ -naphthyl-  
amine and p-methylphenyl- $\beta$ -naphthylamine on the  
oxidation of pure crude rubber and of crude Na-  
butadiene rubber has been investigated; the pro-  
tective properties of the antioxidant (AO) have

Card. 1/4

USSR/Chemical Technology. Chemical Products and I-22  
Their Application--Crude rubbers, natural  
and synthetic. Vulcanized rubber

Abs Jour: Ref Zhur-Khimiya, No 3, 1957, 9787

Abstract: been correlated with its molecular structure.  
The H atom of the amino group appears to be res-  
ponsible for the inhibiting effect. The inter-  
action between a peroxide radical and a molecule  
of I proceeds by the cleavage of the N-H bond.  
The substitution of the H of the amino group leads  
to the almost complete inhibition of the action  
of the AO. The protective properties of the amines  
are based on the mobility of the H of the amino  
group; this mobility can be enhanced by an intensi-  
fication of resonance effects in the molecule, e.g.,  
by the introduction of substituents (OH, OCH<sub>3</sub>,  
CH<sub>3</sub>) in the para-position of the phenyl ring. On  
the basis of the above discussion the following  
new AO are proposed:  $\beta$ ,  $\beta$ -dinaphthylamine- $\beta$ ,  
 $\beta$ -dinaphthyl-p-phenylenediamine and p-hydroxy-

Card 2/4

USSR/Chemical Technology. Chemical Products and Their Application -- Crude rubber, natural and synthetic. Vulcanized rubber, I-21

Abz Journal: Referat Zhur - Khimiya, No 2, 1957, 6031

Author: Kuz'minskiy, A. S., Lyubchanskaya, L. I.

Institution: None

Title: Effect of Mechanical Stresses on Oxidative Processes

Original

Publication: Sb. Stareniye i utomleniye kauchukov i rezin i povysheniye ikh stoykosti. L., Goskhimizdat, 1955, 89-99

Abstract: An investigation was made of the consumption of phenyl-beta-naphthylamine during aging of sulfur- (with polysulfide) and of thiouram- (with monosulfide linkages) vulcanizates in unstressed and stressed state. Consumption of antioxidant in stressed polysulfide vulcanizate (accelerator DPG) is lower than in an analogous monosulfidic. Polysulfidic vulcanizates also show (in  $N_2$  medium) an approximately 2 times greater resilience on repeated deformation, than the monosulfidic. Changes in mechanical properties of samples during the

Card 1/2

USSR/Chemical Technology. Chemical Products and Their Application -- Crude rubber, natural and synthetic. Vulcanized rubber, I-21

Abst Journal: Referat Zhur - Khimiya, No 2, 1957, 6031

Abstract: process of aging (building-up of irreversible deformation on static load) and considerably more rapid diffusion of the polysulfide S, as compared with the monosulfide S (determined by isotope exchange method), indicate greater mobility of polysulfide linkages, which are capable of undergoing rearrangement, of equalizing over stresses and precluding development of disintegration foci. On the other hand the mobility of polysulfide linkages has a detrimental effect in thermal aging under unstressed conditions.

Card 2/2

*Kuz'minskiy, A. S.*

USSR/Chemical Technology. Chemical Products and I-22  
Their Application--Crude rubber, natural and  
synthetic. Vulcanized rubber.

Abs Jour: Ref Zhur-Khimiya, No 3, 1957, 9786

Author : Zuyev, Yu. S. and Kuz'minskiy, A. S.

Inst : Not given

Title : On the Aging of Vulcanized Rubber Under Atmospheric  
Conditions

Orig Pub: Sb.: Stareniye i utomleniye kauchukov i rezin i  
povysheniye ikh stoykosti, Leningrad, Goskhimizdat,  
1955, 157-184

Abstract: See also RZhKhim, 1955, 35967

Card 1/1

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NOVEMBER 11, 1950. Kozminskii, A.S.

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CIA-RDP86-00513R000928110005-5"

AID P - 2286

Subject : USSR/Chemistry

Card 1/1 Pub. 152 - 12/21

Authors : Kuz'minskiy, A. S. and Ye. B. Popova

Title : ~~Study of the thermal oxidation of butadiene-nitrile rubbers~~  
Study of the thermal oxidation of butadiene-nitrile rubbers

Periodical: Zhur. prikl. khim., 28, no.3, 311-316, 1955

Abstract : Three types of butadiene-nitrile rubbers were studied. In the process of thermal oxidation, substances are formed in the rubber which inhibit thermal oxidation and aging of the rubber. Ten diagrams, 3 references (all Russian: 1950-1952).

Institution: Scientific Research Institute of the Rubber Industry

Submitted : J1 28, 1953



KUZMINSKI, A-S.

5

Inhibited oxidation of elastomers. A. B. Kueminski and  
N. N. Lezhnev (Sci. Research Inst. Rubber Ind., Moscow).  
Rubber Chem. and Technol. 28, 512-19 (1955) (in English).  
See C.A. 48, 8573i.  
C. C. Davis

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SOV/81-59-9-33443

Translation from: Referativnyy zhurnal. Khimiya, 1959, Nr 9, p 561 (USSR)

AUTHORS: Degteva, T.G., Belitskaya, R.M., Kuz'minskiy, A.S. (Comm. I);  
Degteva, T.G., Kuz'minskiy, A.S. (Comm. II)

TITLE: The Physico-chemical Foundations of the Process of Oxidation Destruction  
of Swollen Vulcanizates. Communication I. On the Conjugated Oxidation  
of Rubbers and Solvent in Swollen Vulcanizates. Communication II. The  
Effect of Inhibitors on the Oxidation Destruction of Swollen Vulcanizates

PERIODICAL: Tr. N.-1. in-ta rezin. prom-sti, 1956, Nr 3, pp 73 - 85, 86 - 101

ABSTRACT: I. The effect of the solvent (S) on the process of oxidation of a  
vulcanizate (V) from SKB has been investigated. The kinetics of the  
oxidation of S and swollen V was examined on an oxidation installation.  
In the oxidation of S the kinetics of accumulation of stable peroxides  
in them has been studied. At 150°C S can accelerate, as well as inhibit  
the oxidation of V. With an increase in decomposition rate of the  
peroxides formed in the oxidation of S the intensity of the process of  
combined oxidation of V and S increases. The oxidation of S and swollen  
V is a conjugated process. The efficiency of the action of S on the

Card 1/2

69524

SOV/81-59-9-33443

The Physico-chemical Foundations of the Process of Oxidation Destruction of Swollen Vulcanizates. Communication I. On the Conjugated Oxidation of Rubbers and Solvent in Swollen Vulcanizates. Communication II. The Effect of Inhibitors on the Oxidation Destruction of Swollen Vulcanizates.

oxidation of V under similar conditions depends on the rate of formation and decomposition of peroxides of S. II. The behavior of inhibitors (I), as well as of sulfur bonds in the oxidation of swollen V of SKB has been investigated. In the oxidation of V the processes of destruction (D) and structuralization take place simultaneously, in which case D is predominant only in the presence of I. In proportion to the I consumption the structuralization rate can become equal or exceed the D rate. The behavior of oxidation I in swollen and non-swollen V is different due to the appearance of radicals of another reactivity in the conjugated oxidation of rubber and S than in the oxidation of rubber alone. The vulcanization structures can decompose with the separation of sulfur. This decreases the oxidation of V. In the case of heating V without  $O_2$  at  $150^\circ C$  only polysulfide bonds are decomposed, the heating of non-swollen V leads to structuralization.

V. Glagolev

Card 2/2

Translation from: Referativnyy zhurnal. Khimiya, 1959, Nr 9, p 563 (USSR) SOV/81-59-9-33456  
AUTHORS: Zuyev, Yu.S., Kuz'minskiy, A.S., Postovskaya, A.F.  
TITLE: Some Peculiarities of the Light Aging of Rubbers and Vulcanizates  
PERIODICAL: Tr. N.-1. in-ta rezin. prom-sti, 1956, Nr 3, pp 102 - 113

ABSTRACT: The action of light on rubber differs from the action of a high temperature. In the action of light on vulcanizates the role of the optical properties of ingredients is essential, it is necessary therefore to separate the optical and chemical action of the age resistors for establishing an interconnection between the chemical structure of these substances and their chemical light-protective action. Some age resistors and dyestuffs cause a photosensitization in the vulcanizates. The suppression of the sensitizing action and the manifestation of the efficiency of the sensitizers can be obtained using vigorously light-absorbing ingredients. ✓

Card 1/1

V. Glagolev



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ADZMINSKAY, A.S.

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17. and admin. of 60% and 10% of the total amount

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... of sulphur bands which form the vulcanisate  
network in G. D. DEUTERVA and A. S. M.

the sulphur bands The vulcanisate is a